2005
TRIAL HIGHER SCHOOL CERTIFICATE
EXAMINATION

General Mathematics

General Instructions

- Reading Time- 5 minutes
- Working Time - 2½ hours
- Write using a blue or black pen
- Calculators may be used
- A Formulae Sheet is provided at the back of this paper which may be detached and used throughout the paper.

Section I pages 3 – 7

Total marks (**22**)

- Attempt Questions 1-22
- Answer on the Multiple Choice answer sheet provided.
- Allow about 30 minutes for this section

Section II pages 8 - 14

Total marks (**78**)

- Attempt questions 23 – 28
- Answer on the blank paper provided, unless otherwise instructed. Start a new sheet for each question.
- Allow about 2 hours for this section

Section I

Total marks (22)

Attempt Questions 1-22

Allow about 30 minutes for this section

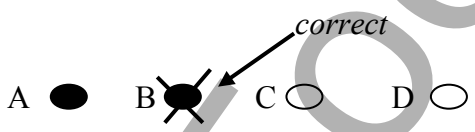
Use the multiple choice answer sheet.
Select the alternative A, B, C or D that best answers the question. Fill in the response oval completely.

Sample

2 + 4 = ? (A) 2 (B) 6 (C) 8 (D) 9

If you think you have made a mistake, put a cross through the incorrect answer and fill in the new answer.

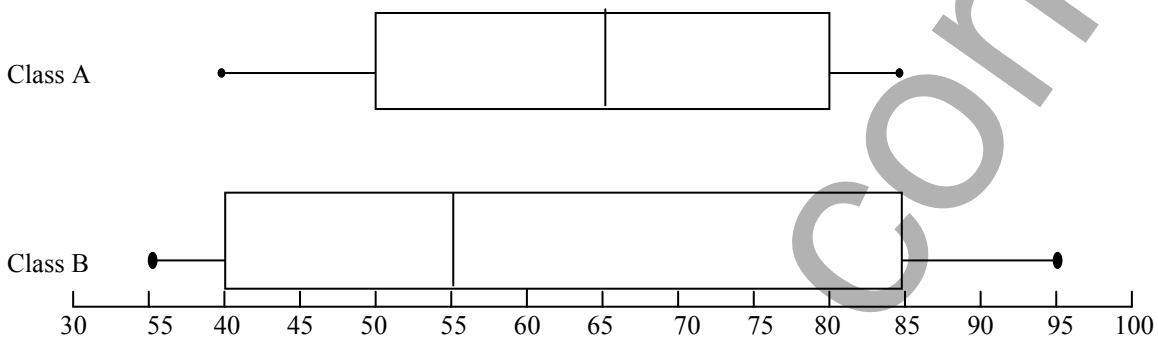
If you change your mind and have crossed out what you consider to be the correct answer, then indicate this by writing the word *correct* and drawing an arrow as follows:



1. Use the formula $S = \pi r(r + 2h)$ to find the value of S (to 2 decimal places) if $r = 2{\bullet}3$ and $h = 5{\bullet}003$.

(A) 26•63 (B) 74•60 (C) 88•92 (D) 197•38

2. The results gained by the students in two classes A and B on a test are shown below:



The difference between the interquartile range for Class A and Class B is

(A) 10 (B) 15 (C) 30 (D) 45

3. A die is biased so that the probability of throwing a six is twice that of any other single number. If the die was tossed 50 times, the number of sixes that would be expected would be

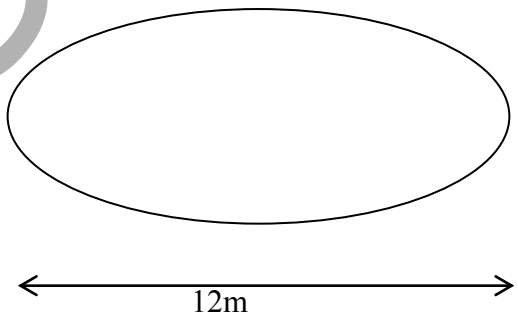
(A) 7 (B) 8 (C) 14 (D) 16

4. Mr Stone took out a car loan for \$25 000 at 12% p.a. interest, compounding monthly over 6 years. The amount of each monthly repayment can be found using

(A) $M = 25000 \times \left\{\dfrac{0{\cdot}01 \times 1{\cdot}01^{6}}{1{\cdot}01^{6} - 1}\right\}$ (B) $M = 25000 \times \left\{\dfrac{0{\cdot}01 \times 1{\cdot}01^{72}}{1{\cdot}01^{72} - 1}\right\}$

(C) $M = 25000 \times \left\{\dfrac{0{\cdot}12 \times 1{\cdot}12^{6}}{1{\cdot}12^{6} - 1}\right\}$ (D) $M = 25000 \times \left\{\dfrac{0{\cdot}12 \times 1{\cdot}12^{72}}{1{\cdot}12^{72} - 1}\right\}$

5. The following ellipse has an area of $50m^2$.



The length of the semi-minor axis correct to two decimal places is

(A) 2•65 (B) 2•66 (C) 1•32 (D) 1•33

6. Tim can run 100 metres in 9•79 seconds. His speed in kilometres per hour is

(A) 10•2 (B) 12•24 (C) 36•8 (D) 85•0

7. Belinda works a 40 hour week. In addition she is paid time-and-a-half for any extra hours worked. Last week she worked a total of 48 hours and was paid $956•80. Her normal hourly rate of pay is

(A) $13•30 (B) $15•95 (C) $18•40 (D) $19•95

8. If the surface area (S) of a sphere of radius (r) units is found using the formula $S = 4\pi r^2$. The radius of a sphere which has a surface area of 150cm^2 is closest to

(A) 1cm (B) 3cm (C) 6cm (D) 12cm

9. $16 - 4(x - 5) = ?$

(A) $12x + 60$ (B) $12x - 60$ (C) $-4 - 4x$ (D) $36 - 4x$

10. Lucky Envelopes can be bought for $2 each. There are 100 envelopes.
1 contains $100
5 contain $10
and the rest contain no money.
The financial expectation in this game is

(A) −$0•50 (B) −$0•38 (C) $0•50 (D) $50

11. The probability that a man will live to the age of 80 is $\frac{3}{5}$ while the probability that his wife will live to the age of 80 is $\frac{5}{7}$. The probability that both will live to the age of 80 can be found using:

(A) $\frac{3}{5}+\frac{5}{7}$ (B) $\frac{3}{5}\times\frac{5}{7}$ (C) $\frac{2}{5}\times\frac{2}{7}$ (D) $1-\left(\frac{2}{5}\times\frac{2}{7}\right)$

12. Change the subject of $m = \frac{nx^2}{3}$ to make n the subject.

(A) $n = \frac{3m}{x^2}$ (B) $n = \frac{m}{x^2}$ (C) $n = 3m^2 - x^2$ (D) $n = 3m^2 - 3x^2$

13. Given that y varies as the cube of x, by what factor is y multiplied if x is multiplied by $\frac{1}{3}$?

(A) $\frac{1}{27}$ (B) $\frac{1}{3}$ (C) 3 (D) 27

14. Terri has 500 phonicom shares with a current market value of \$3•60 each. During the past year she has received a total dividend of \$220.
What is the current dividend yield on these shares?

(A) 0•72% (B) 1•6% (C) 3•6% (D) 12•2%

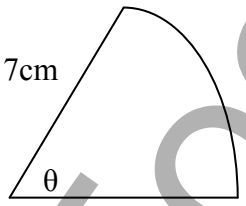
15. The student population for a junior high school is shown below.

Year	Number of Students
7	210
8	195
9	215
10	180

Grace needs to survey 100 of the students. If she decides to take a stratified sample how many students from year 9 should she include in her survey?

(A) 25 (B) 27 (C) 50 (D) 54

16. This is a sketch of a sector of a circle.



If the area of this circle is 32cm^2, find the angle θ to the nearest degree.

(A) 5° (B)10° (C) 75° (D) 262°

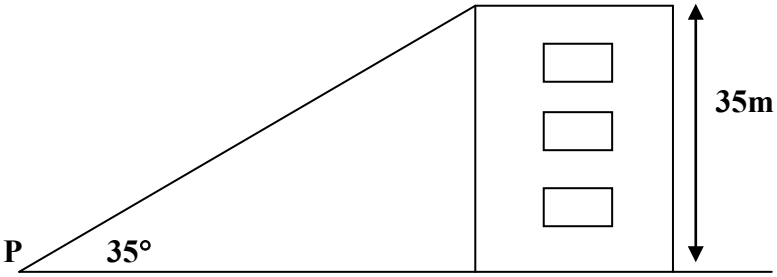
17. Gerald purchased a new truck at the beginning of 2005 for \$41 500. The truck depreciates by 20% during the first year and in each subsequent year the truck depreciates by 15% of its value at the beginning of that year. Using the declining balance method of depreciation, the value of the truck after 3 years is

(A) \$23 987 (B) \$25 486 (C) \$33 200 (D) \$65 861

18. The probability that a set of traffic lights will show green is $\frac{3}{8}$. Garry has to drive through two sets of lights to get to work. The probability that the lights will be green at least once is

(A) $\frac{9}{64}$ (B) $\frac{3}{8}$ (C) $\frac{39}{64}$ (D) $\frac{3}{4}$

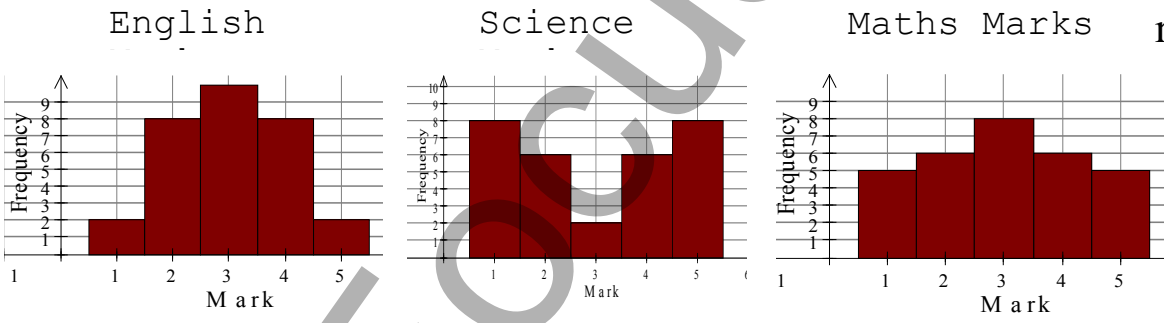
19.



The angle of elevation of the top of a building from a point P on the ground is 35°. If the building is 35 metres tall, the distance from the base of the building to the point P to the nearest metre is

(A) 20 (B) 25 (C) 43 (D) 50

20. The following graphs show the distribution of test marks from the same Year 7 class in English, Mathematics and Science.



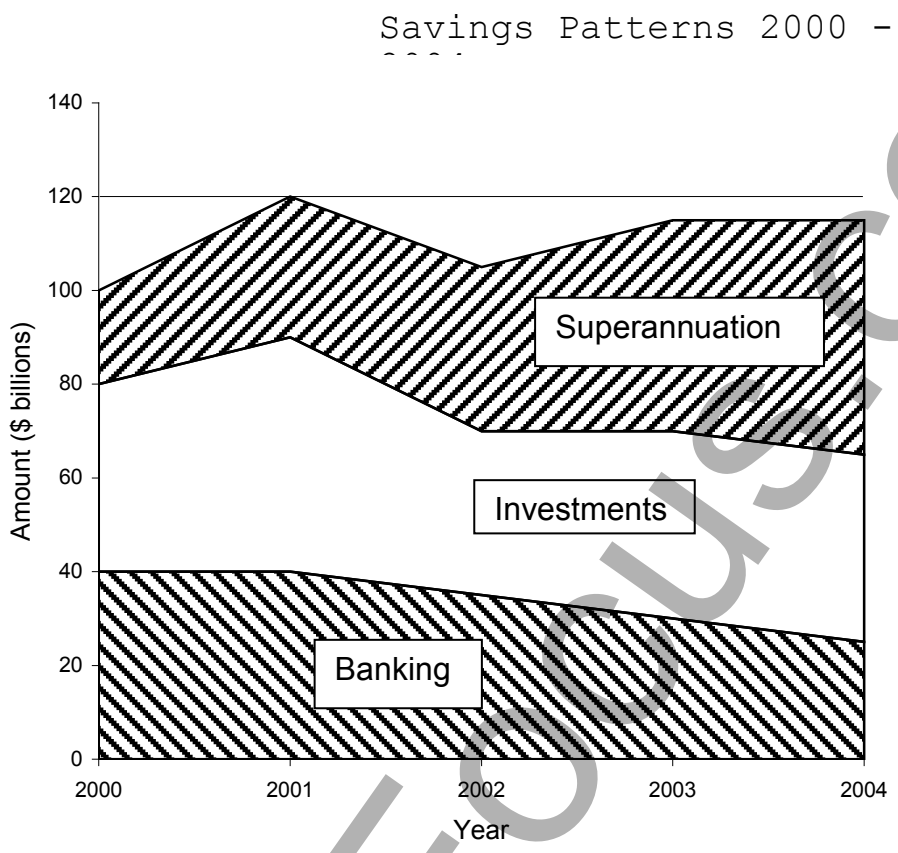
The subject whose results have the greatest standard deviation is

(A) English (B) Mathematics (C) Science (D) All of them are the same.

21. Peter and Jennifer deposit $1000 at the end of each year into an annuities fund paying interest at the rate of 8% p.a. The value of the annuity after 20 years will be closest to:

(A) $24 700 (B) $41 400 (C) $45 800 (D) $49 400

22. The area chart below shows the changing pattern of the way savings were used in the years 2000-2004.



In 2001, the percentage of savings that were placed in Investments was closest to

(A) 30% (B) 40% (C) 50% (D) 60%

Section II

Total Marks (78)
Attempt Questions 23 - 28
Allow about 2 hours for this section.

Answer all questions, starting each question on a new sheet of paper with your name and question number at the top of the page. Do not write on the back of sheets.

Question 23 (13 marks) Start a new sheet of paper. **Marks**

(a) Solve $\frac{2x-5}{4} - 5 = 11$ **3**

(b) James deposits $2 000 at the end of each year into an annuity fund paying 8% p.a. interest.

i. Calculate the value of the investment after 7 years. **2**

ii. What amount could Barbara invest now at the same rate to achieve the same financial outcome in 5 years time? **2**

(c) In the Western Horse Race there are 6 starters. Three of the saddle cloths are coloured red, two are coloured blue and the other is coloured white. The saddle cloths are allocated at random before the race. Gai has two horses entered in the race.

i. Draw a probability tree for the possible combinations of saddle cloth colours that Gai's horses could carry. **2**

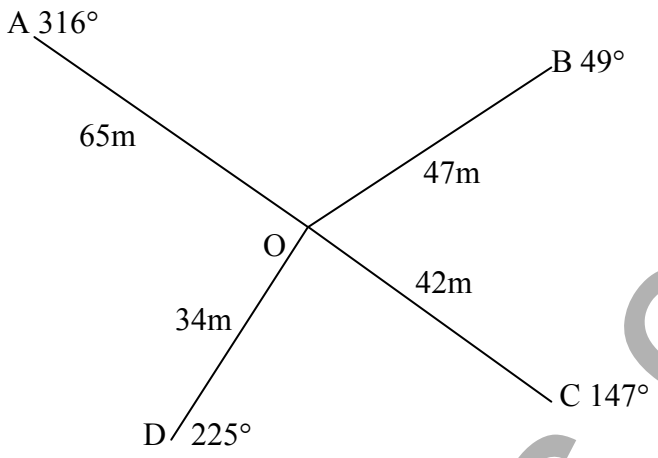
ii. What is the probability that Gai's two horses will both be wearing red saddle cloths? **1**

iii. Find the probability that Gai's two horses will be wearing different coloured saddle cloths? **2**

iv. Michelle decided to back a horse wearing a red saddle cloth. She reasoned that since there are more red saddle cloths the winner is more likely to be wearing a red. So she is more likely to back the winner if she picks red. Comment on the accuracy of her reasoning. **1**

Question 24 (13 marks) Start a new sheet of paper. **Marks**

(a) The following diagram shows the result of a compass radial survey.



i. Calculate the size of angle AOB. **1**

ii. Find the area of the triangle AOB. **1**

iii. Calculate the distance between A and B. **2**

(b) i. Copy and complete the following table for the rule $y = 1 \bullet 5^x$, giving your answers to one decimal place. **2**

x	0	1	2	3	4
y					

ii. Using the graph paper provided on page 16 graph the above point on a number plane and join them using a smooth curve. **1**

iii. Use the graph to determine the answers to the following: **2**

α. $1 \bullet 5^{2 \bullet 5} = ?$

β. Find the value of x if $1 \bullet 5^x = 4$.

(c) A(15°N, 151°E), B(25°S, 19°W) and C(35°S, 151°E) are three points on the Earth's surface.

i. What time is it at B when it is 10am Tuesday at C? **2**

ii. What is the distance between A and C in nautical miles?` **1**

iii. How long will it take a yacht to sail from A to C at a speed of 20 knots? **1**

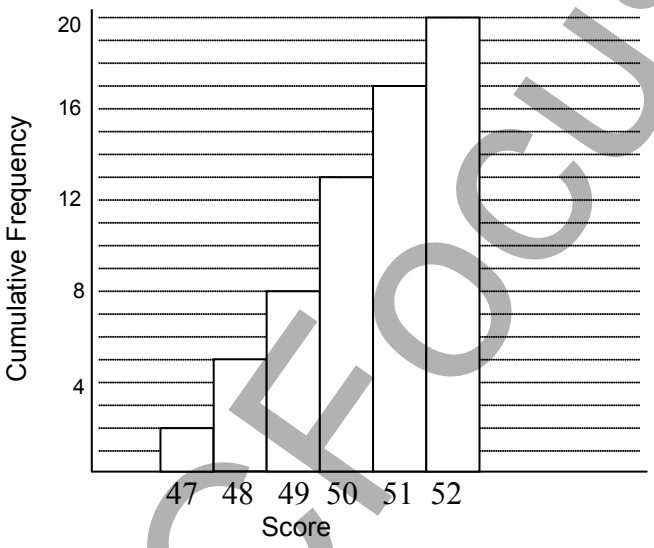
Question 25 (13 marks) Start a new sheet of paper. **Marks**

(a) For pieces of wire of the same material and length, the electrical resistance R ohms is inversely proportional to the square of the diameter, d millimetres. When the diameter is 3mm, the resistance is 8 ohms. Calculate the resistance when the diameter is 2mm **2**

(b) The number of days between billing and payment of charge accounts of a large finance company is normally distributed with a mean of 18 days and a standard deviation of 3 days.
What percentage of bills will be paid:

i. between 15 and 21 days? **1**
ii. between 12 and 21 days? **1**
iii. in less than 9 days? **1**

(c) The number of matches in twenty boxes is illustrated in the following cumulative frequency histogram.



i. Copy and complete the following frequency distribution table for the results shown in the cumulative frequency histogram. **2**

Score	Frequency

ii. By using a calculator, find the mean number of matches per box and the standard deviation. **2**

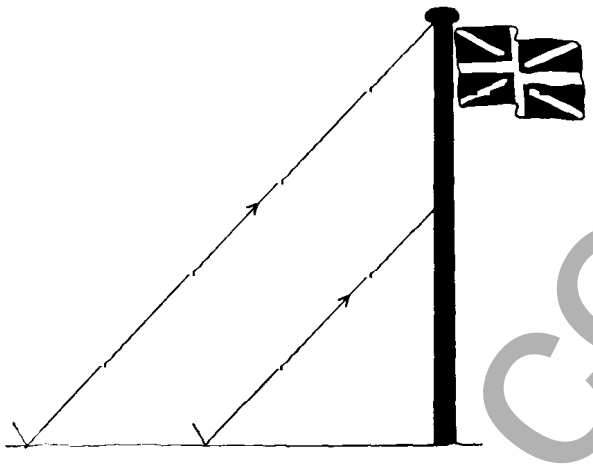
iii. On testing five additional boxes the number of matches contained in them was found to be: **1**

48, 52, 48, 50, 52

What is the effect does the addition of these scores have on the mean and the standard deviation?

Question 25 (continued)

d. **3**



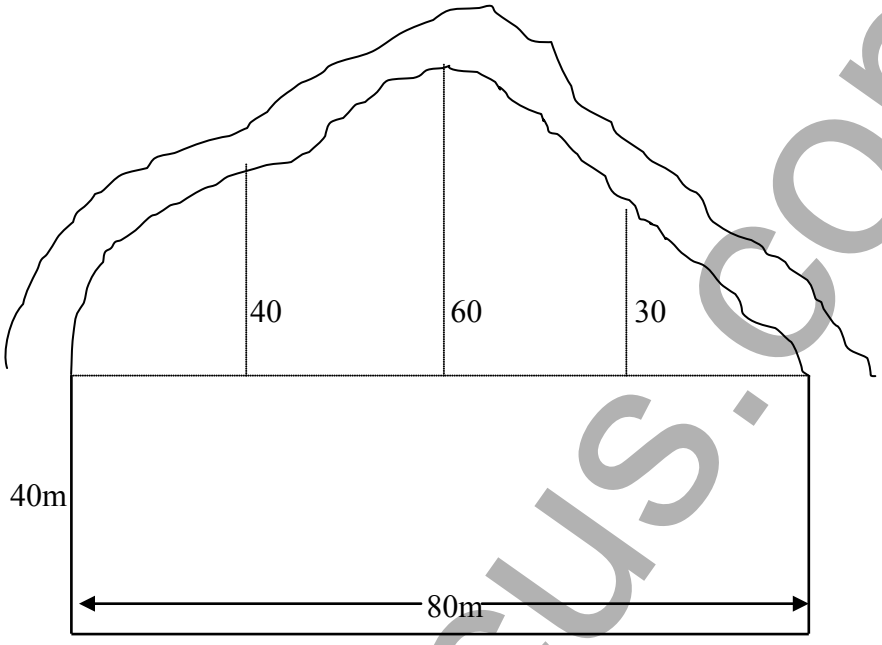
Two guy ropes support a flagpole which is 18 m high. They are attached to two points on the ground, the shorter being 5 m from the base of the pole.

The shorter guy rope is attached to a point $\frac{2}{3}$ up the pole and the longer guy rope is attached to the top of the pole.

How much rope is required for the two guy ropes?

Question 26 (13 marks) Start a new sheet of paper. **Marks**

(a) A Diagram of Mr Charter's paddock is shown below. It is bounded by three fences and a river as illustrated below.



i. Use two applications of Simpson's rule and other methods to calculate the area of the paddock. **4**

ii. If the paddock is to have top soil laid to a depth of 20cm, over it's entire area. What is the volume of top-soil required? **1**

(b) Four girls Lisa, Caitlin, Brittni and Morgan sit on a park bench.

i. In how many different ways can they sit? **1**

What is the probability that:

ii. they are seated BCLM from left to right? **1**

iii. Brittni sits on the right hand side? **1**

Question 26 is continued on page 13

Question 26 (continued)

(c) The following table shows the tax rates for residents of Australia for the year 2004-5.

Taxable Income	Tax on this income
\$0 - \$6 000	Nil
\$6 001 - \$21 600	17¢ for each \$1 over \$6 000
\$21 601 - \$58 000	\$2 652 plus 30¢ for each \$1 over \$21 600
\$58 001 - \$70 000	\$13 572 plus 42¢ for each \$1 over \$58 000
Over \$70 000	\$18 612 plus 47¢ for each \$1 over \$70 000

In addition, a medicare levy of 1•5% applies and is calculated on the taxable income. During the 2004/5 financial year Joanne earned \$64 000 but had allowable tax deductions of \$3 356.

i. Calculate her taxable income. **1**
ii. How much tax does Joanne have to pay (including medicare levy)? **2**
iii. If Joanne paid \$16 300 in PAYE tax instalments throughout the past year, calculate the refund to which she is entitled. **2**

Question 27 (13 marks) Start a new sheet of paper. **Marks**

(a) The lifetimes in hours of 10 batteries of Brand A and 10 batteries of Brand B are recorded below.

Brand A	79	77	110	120	84	55	74	66	95	62
Brand B	100	86	93	104	64	71	65	73	82	75

i. Display the above information in a back to back stem and leaf plot. **3**
ii. Calculate the Mean and Median for each brand of battery. **4**
iii. Using the information obtained from parts i. and ii. to determine which brand is more reliable, giving reasons for your answer. **2**

(b) Two towns A and B are 80 kilometres apart, with A being due East of B. A third town C is situated on a bearing of 315° from A and 067° from B.

i. Draw a diagram to represent the positions of A, B and C, marking on it all the relevant information. **1**
ii. What is the size of the angle ACB? **1**
iii. Calculate the distance of town C from town A **2**

Question 28 (13 marks) Start a new sheet of paper. **Marks**

(a) The results of the last 200 court cases and what the defendant pleaded are recorded in the following table.

Verdict	Defendants initial plea		
	Guilty	Not Guilty	Total
Guilty	60	17	77
Not Guilty	5	118	123
Total	65	135	200

i. What percentage of the court cases saw a guilty verdict? **1**

ii. What is the probability that if a defendant pleaded not guilty, their verdict was guilty? **1**

(b) The following table shows the fortnightly repayments required to repay certain loan amounts at 11•5% p.a. over a given number of years.

Amount Borrowed	2Years	3 Years	4 Years	5 Years
$12 000	$269	$190	$151	$127
$16 000	$358	$253	$201	$170
$20 000	$447	$316	$251	$212
$24 000	$536	$379	$301	$254
$26 000	$581	$411	$326	$275
$30 000	$670	$474	$376	$317

i. Therese takes out a loan for $24 000 over period of five years. How much interest will she pay on the loan? **2**

ii. How much money would Therese save if she could pay off the loan in three years instead of five? **1**

Question 28 is continued on page 15

Question 28 (continued)

(c) The following table shows the entry costs and the patronage on a particular day at different theme parks in the city.

Entry Cost ($C)	4	8	12	16	20	24	28	32
Number of Visitors (N)	54	30	48	21	17	12	8	5

(i) Draw a scatter plot of this information on the grid provided on page 17 **1**

(ii) Describe the correlation between the two variables. **1**

(iii) Do you think that there is a causal relationship between the Cost of entry and the number of visitors? Explain. **1**

(iv) On your scatter plot draw in a median regression line. **3**

(v) Determine the equation of this regression line in the form $N = mC + b$ **2**

End of Exam

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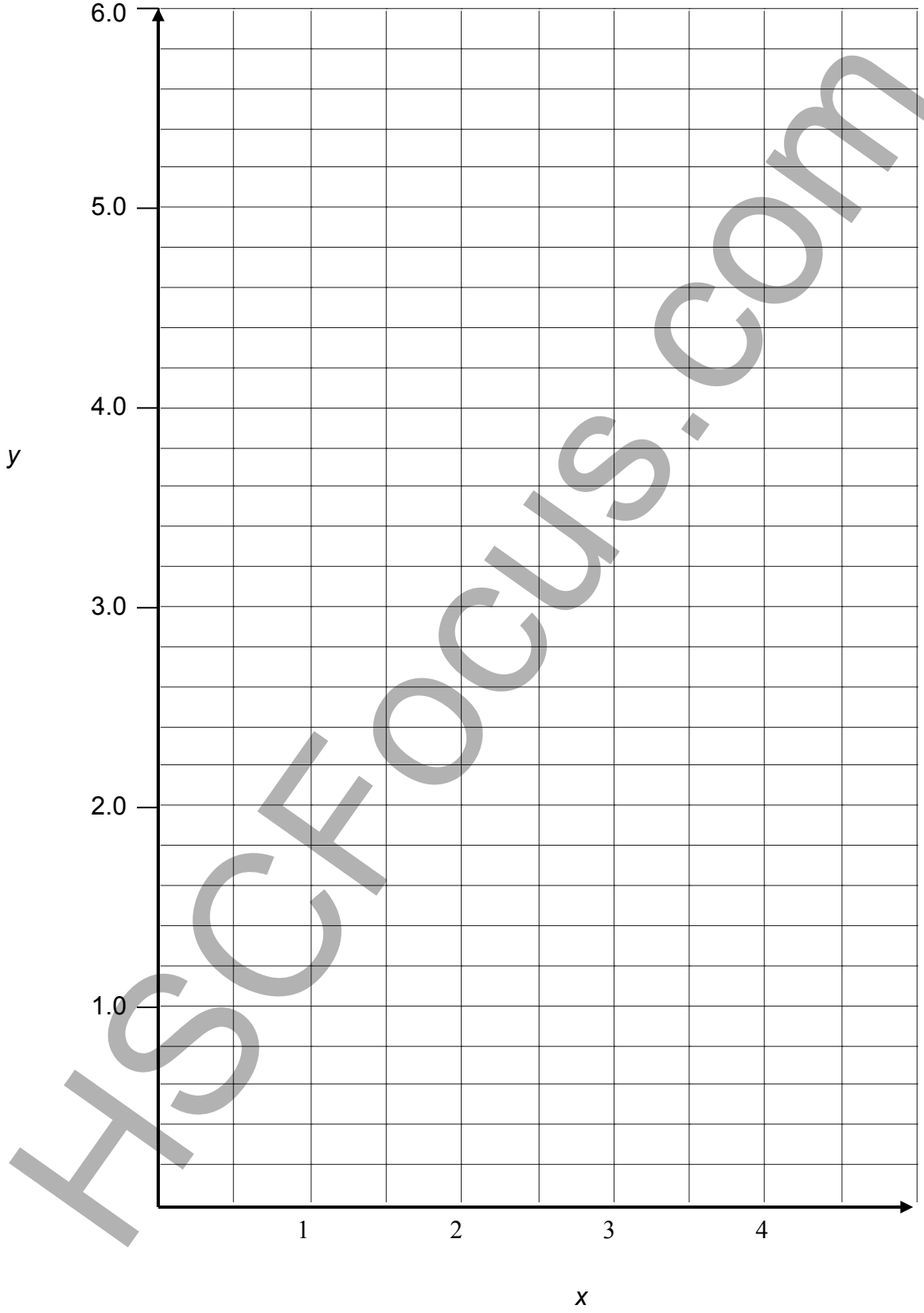
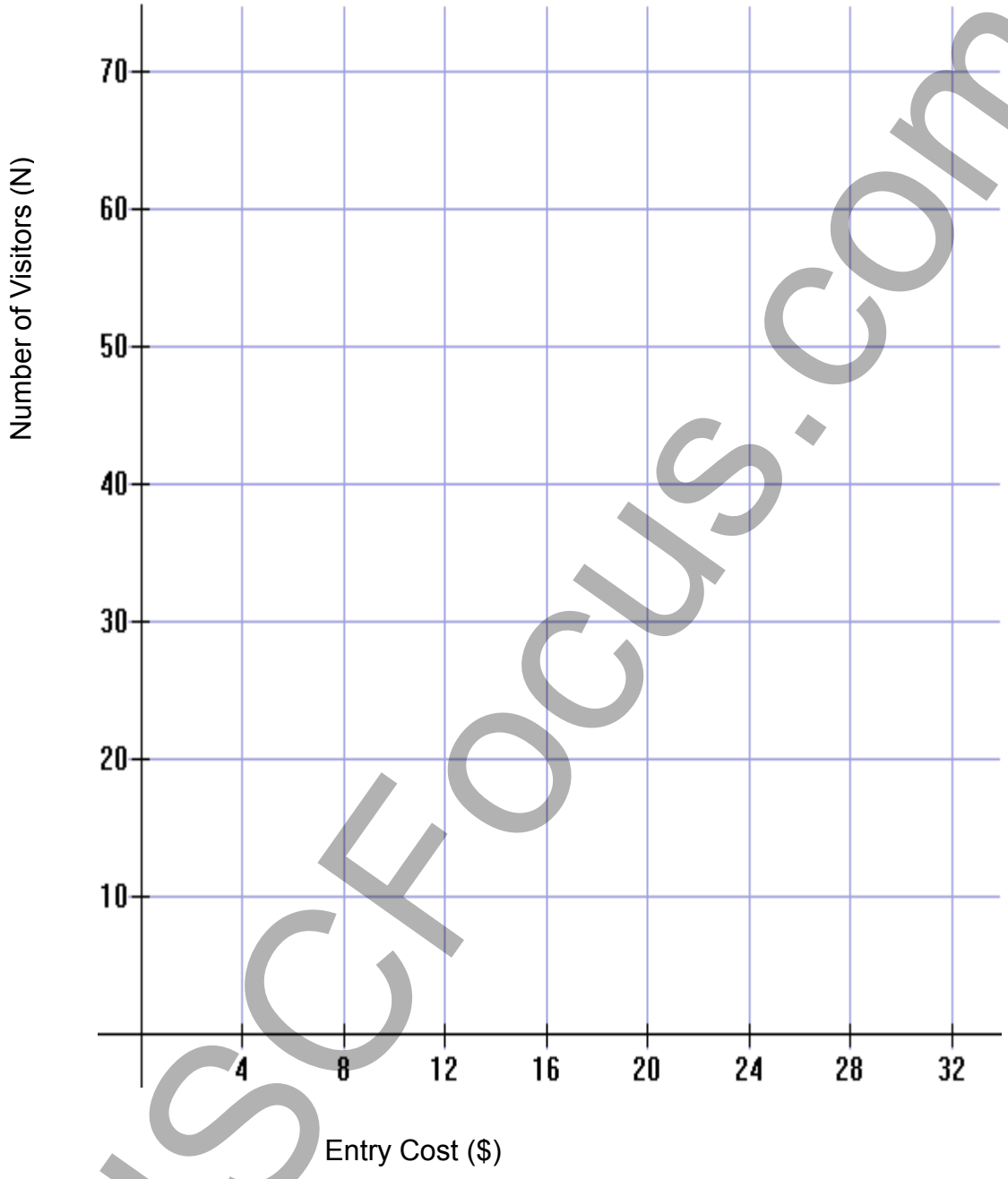
Grid paper for Question 24 (b)



Grid paper for Question 28 (c)(i)



Formulae Sheet

Area of an annulus

$A = \pi (R^2 - r^2)$

R = radius of outer circle
r = radius of inner circle

Area of an ellipse

$A = \pi ab$

a = length of semi-major axis
b = length of semi-minor axis

Area of a sector

$A = \frac{\theta}{360} \pi r^2$

θ = number of degrees in central angle

Arc length of a circle

$l = \frac{\theta}{360} 2\pi r$

θ = number of degrees in central angle

Surface area of a sphere

$A = 4\pi r^2$

Simpson's rule for area approximation

$A \approx \frac{h}{3}(d_f + 4d_m + d_l)$

h = distance between successive measurements
d_f = first measurement
d_m = middle measurement
d_l = last measurement

Volume

Cone $V = \frac{1}{3}\pi r^2 h$

Cylinder $V = \pi r^2 h$

Pyramid $V = \frac{1}{3} Ah$

Sphere $V = \frac{4}{3}\pi r^3$

A = area of base
h = perpendicular height

Mean of a distribution

$\bar{x} = \frac{\sum x}{n}$

$\bar{x} = \frac{\sum fx}{\sum f}$

x = individual score
$\bar{x}$ = mean

Formula for z-scores

$z = \frac{x - \bar{x}}{s}$

s = standard deviation

Probability of an event

The probability of an event where outcomes are equally likely is given by:

$$P(event) = \frac{number\ of\ favourable\ outcomes}{total\ number\ of\ outcomes}$$

Simple interest

$I = Prn$

P = initial quantity
r = percentage interest rate per period expressed as a decimal
n = number of periods

Compound interest

$A = P(1 + r)^n$

A = final balance
P = initial quantity
n = number of compounding periods
r = percentage interest rate per compounding period expressed as a decimal

Future value (A) of an annuity

$$A = M\left\{\frac{(1+r)^n - 1}{r}\right\}$$

M = contribution per period, paid at the end of the period

Present value (N) of an annuity

$$N = M\left\{\frac{(1+r)^n - 1}{r(1+r)^n}\right\}$$

or

$$N = \frac{A}{(1+r)^n}$$

Straight-line formula for depreciation

$S = V_0 - Dn$

S = salvage value of asset after n periods
V_0 = purchase price of the asset
D = amount of depreciation apportioned per period
n = number of periods

Declining balance formula for depreciation

$S = V_0(1 - r)^n$

S = salvage value of asset after n periods
r = percentage interest rate per period, expressed as a decimal

Sine rule

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

Area of a triangle

$$A = \frac{1}{2}ab\sin C$$

Cosine rule

$c^2 = a^2 + b^2 - 2ab\cos C$

or

$$\cos C = \frac{a^2 + b^2 - c^2}{2ab}$$

Gradient of a straight line

$$m = \frac{vertical\ change\ in\ position}{horizontal\ change\ in\ position}$$

Gradient–intercept form of straight line

$y = mx + b$

m = gradient
b = y-intercept

Multiple Choice Answer Sheet

Name _____

Completely fill the response oval representing the most correct answer.

1.	A ⬭	B ⬭	C ⬭	D ⬭
2.	A ⬭	B ⬭	C ⬭	D ⬭
3.	A ⬭	B ⬭	C ⬭	D ⬭
4.	A ⬭	B ⬭	C ⬭	D ⬭
5.	A ⬭	B ⬭	C ⬭	D ⬭
6.	A ⬭	B ⬭	C ⬭	D ⬭
7.	A ⬭	B ⬭	C ⬭	D ⬭
8.	A ⬭	B ⬭	C ⬭	D ⬭
9.	A ⬭	B ⬭	C ⬭	D ⬭
10.	A ⬭	B ⬭	C ⬭	D ⬭
11.	A ⬭	B ⬭	C ⬭	D ⬭
12.	A ⬭	B ⬭	C ⬭	D ⬭
13.	A ⬭	B ⬭	C ⬭	D ⬭
14.	A ⬭	B ⬭	C ⬭	D ⬭
15.	A ⬭	B ⬭	C ⬭	D ⬭
16.	A ⬭	B ⬭	C ⬭	D ⬭
17.	A ⬭	B ⬭	C ⬭	D ⬭
18.	A ⬭	B ⬭	C ⬭	D ⬭
19.	A ⬭	B ⬭	C ⬭	D ⬭
20.	A ⬭	B ⬭	C ⬭	D ⬭
21.	A ⬭	B ⬭	C ⬭	D ⬭
22.	A ⬭	B ⬭	C ⬭	D ⬭

WESTERN REGION

2005
TRIAL HIGHER SCHOOL CERTIFICATE
EXAMINATION

General Mathematics

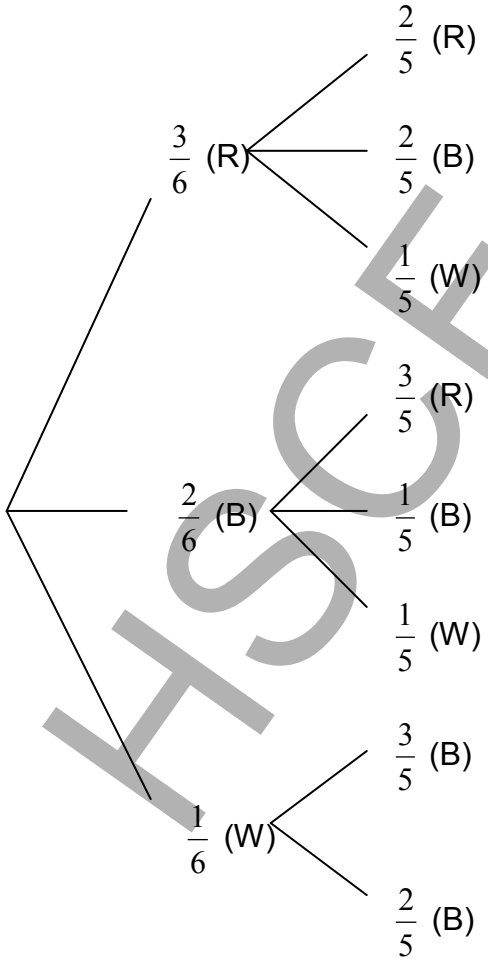
SOLUTIONS

Multiple Choice Answer Sheet

Name _____Marking Sheet___

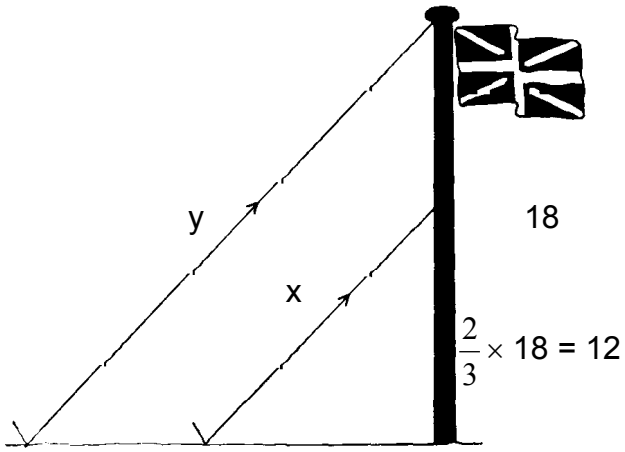
Completely fill the response oval representing the most correct answer.

1.	A ○	B ○	C ●	D ○
2.	A ○	B ●	C ○	D ○
3.	A ○	B ○	C ●	D ○
4.	A ○	B ●	C ○	D ○
5.	A ●	B ○	C ○	D ○
6.	A ○	B ○	C ●	D ○
7.	A ○	B ○	C ●	D ○
8.	A ○	B ●	C ○	D ○
9.	A ○	B ○	C ○	D ●
10.	A ●	B ○	C ○	D ○
11.	A ○	B ●	C ○	D ○
12.	A ●	B ○	C ○	D ○
13.	A ●	B ○	C ○	D ○
14.	A ○	B ○	C ○	D ●
15.	A ○	B ●	C ○	D ○
16.	A ○	B ○	C ●	D ○
17.	A ●	B ○	C ○	D ○
18.	A ○	B ○	C ●	D ○
19.	A ○	B ○	C ○	D ●
20.	A ○	B ○	C ●	D ○
21.	A ○	B ○	C ●	D ○
22.	A ○	B ●	C ○	D ○

	SECTION II	MARK	COMMENTS
23	a. $\frac{2x-5}{4}-5=11$ $^4\left(\frac{2x-5}{4}\right)-{}^4(5)={}^4(11)$ $2x-5-20=44$ $2x-25=44$ $2x=69$ $\quad x=34\frac{1}{2}$	3	Correct answer 1 mark off for each incorrect step
	b. i. $A=M\left\{\frac{(1+r)^n-1}{r}\right\}$ $=2000\left\{\frac{(1+0\cdot08)^7-1}{0\cdot08}\right\}$ = \$17 845•61	2	1 – sub into correct formula 1 –answer
	ii. $N=\frac{A}{(1+r)^n}$ $=\frac{17845\cdot61}{(1+0\cdot08)^5}$ = \$12 145.42	1 2	1 – sub 1 answer
	c. i.  	2	1 - for correct outcomes on the tree 1 - for correct probabilities Take 1 mark off per mistake

	SECTION II	MARK	COMMENTS
	c. ii. P(RR) = $\frac{3}{6}\times\frac{2}{5}=\frac{1}{5}$	1	
	iii. P(different colours) = 1 — [P(RR) + P(BB)] = 1 — $[\left(\frac{3}{6}\times\frac{2}{5}\right)+\left(\frac{2}{6}\times\frac{1}{5}\right)]$ = 1 — $\left(\frac{1}{5}+\frac{1}{15}\right)$ = 1 — $\frac{4}{15}$ = $\frac{11}{15}$	2	Correct answer 1 - working 1 – answer
	iv. . Michelle is only correct in that, as there are more red saddle cloths, the winner is more likely to be allocated red. However, as horses have different abilities, the best horse could be allocated white, or even if it gets red, she could back one of the other red cloth horses.	1	Comment – mentioning different ability
24.	a. i. ∠AOB = (360 — 316) + 49 = 44 + 49 = 93°	1	
	ii. Area AOB = ½ab sin C = ½(65)(47)Sin 93° = 1525•41m^2 (2dp.)	1	
	iii. $a^2 = b^2 + c^2 - 2bc\cos A$ $AB^2 = 65^2 + 47^2 - 2(65)(47)\cos 93°$ AB = 82•18m (2dp)	2	
	b. i.		2 - answer 1 – if don't take root
	x: 0, 1, 2, 3, 4 y: 1, 1•5, 2•3, 3•4, 5•1	2	
	ii. See graph at end.	1	All 5 correct
	iii. α 2.8 β 3.4	2	Take 1 off per incorrect entry Graph
	c. i. B to C Longitude Difference = 19 + 151 = 170°	1	1 per answer
	Time Difference = 170 × 4 = 680 min = 11h 20 min	1	time difference
	Time at B = 10.40 p.m. Monday.		

	SECTION II	MARK	COMMENTS
	ii. Distance AC = (35 + 15) × 60 = 3000 nautical miles.	1	correct day and time
	iii. Time to sail = $\frac{3000}{20}$ = 150 hours = 6 days, 6 hours	1	
25	a. $R \propto \frac{1}{d^2}$		
	$R = \frac{k}{d^2}$ but R = 8 when d = 3		
	$8 = \frac{k}{3^2}$		
	$k = 72$	1	
	$\therefore R = \frac{72}{d^2}$		
	When $d = 2$, $R = \frac{72}{2^2}$ = 18 ohms.	1	Constant of variation
	b. $\bar{x} = 18$, $\sigma_n = 3$		Answer
	$\bar{x} + 3\sigma_n = 27$		
	$\bar{x} + 2\sigma_n = 24$		
	$\bar{x} + 1\sigma_n = 21$		
	$\bar{x} = 18$		
	$\bar{x} - 1\sigma_n = 15$		
	$\bar{x} - 2\sigma_n = 12$		
	$\bar{x} - 3\sigma_n = 9$		
	i. 68%	1	
	ii. (47•5 + 34)% = 81•5%	1	
	iii. 0•15%	1	
	c. i.		
	Score | Frequency 47 | 2 48 | 3 49 | 3 50 | 5 51 | 4 52 | 3	2	1 for each correct column
	ii. $\bar{x} = 49•75$, $\sigma_n = 1.545153714 = 1.55$ (2dp)	2	
	iii. $\bar{x} = 49•8$, $\sigma_n = 1.6 = 1.6$ (2dp)		for each of mean and standard
	The additional scores have resulted in an addition of 0•05 to both the mean and the standard deviation.		

	SECTION II	MARK	COMMENTS
	d.  5	1	deviation correct
	By Pythagoras, $x^2 = 5^2 + 12^2$ $= 25 + 144$ $= 169$ $x = 13$	1	effect of adding the scores
	Using Ratios of similar triangles $\frac{y}{13} = \frac{18}{12}$ $y = \frac{18}{12} \times 13$ $= 19.5$	1	Use of Pythagoras to find shorter rope
	$\therefore$ Length of rope = 13 + 19.5 = 32.5 metres	1	Use of similar triangles to find length of longer rope
26	a. i. . Area = $\frac{h}{3}[d_f + d_l + 4d_m] + lb$ $= \frac{20}{3}[0 + 60 + 4(40)] + \frac{20}{3}[60 + 0 + 4(30)] + (80 \times 40)$	2	Answer
	$= \frac{20}{3}(220) + \frac{20}{3}(180) + 3200$	1	1 for each application of Simpson's Rule
	$= 5866\frac{2}{3}\ m^2$	1	
	ii. Volume = Ah $= (5866\frac{2}{3}) \times 0{\bullet}2$ $= 1173\frac{1}{3}\ m^3$	1	Area of Rectangle Correct answer
	b. i. Number of Ways = $4 \times 3 \times 2 \times 1$ = 24	1	

	SECTION II	MARK	COMMENTS
	ii. P(BCLM) = $\frac{1}{24}$	1	
	iii. P(Brittni sits on Right) = $\frac{1}{4}$	1	
	c. i. Taxable Income = \$64 000 — \$3 356 = \$60 644	1	
	ii. Tax = (60 644 – 58 000) × 0•42 + 13 572 + 1•5% of 60 644 = 14 682•48 + 909•66 = \$15 592•14	2	
	iii. Refund = \$16 300 — \$15 592•14 = \$707•86	1	1 - for tax 1 – for medicare levy
27	a. i.	3	

Brand A		Brand B
5	5	
6 2	6	4 5
9 7 4	7	1 3 5
4	8	2 6
5	9	3
	10	0 4
0	11	
0	12	

1 – stem and 1 for each correct leaf

ii. **Brand A**

Mean = 82•2
Median = 78

2

Brand B

Mean = 81•3
Median = 78•5

1 for each

2

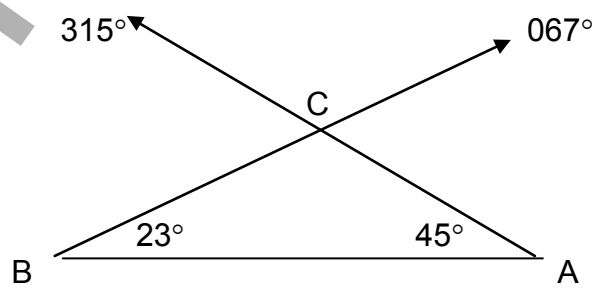
iii. Brand B is more reliable as the mean and the median are close to one another. The stem and leaf plot also indicates the lifetimes are more consistent. The average for Brand A has only been increased due to the two outlying scores.

2

1 for each

1 - correct brand
1 - reason

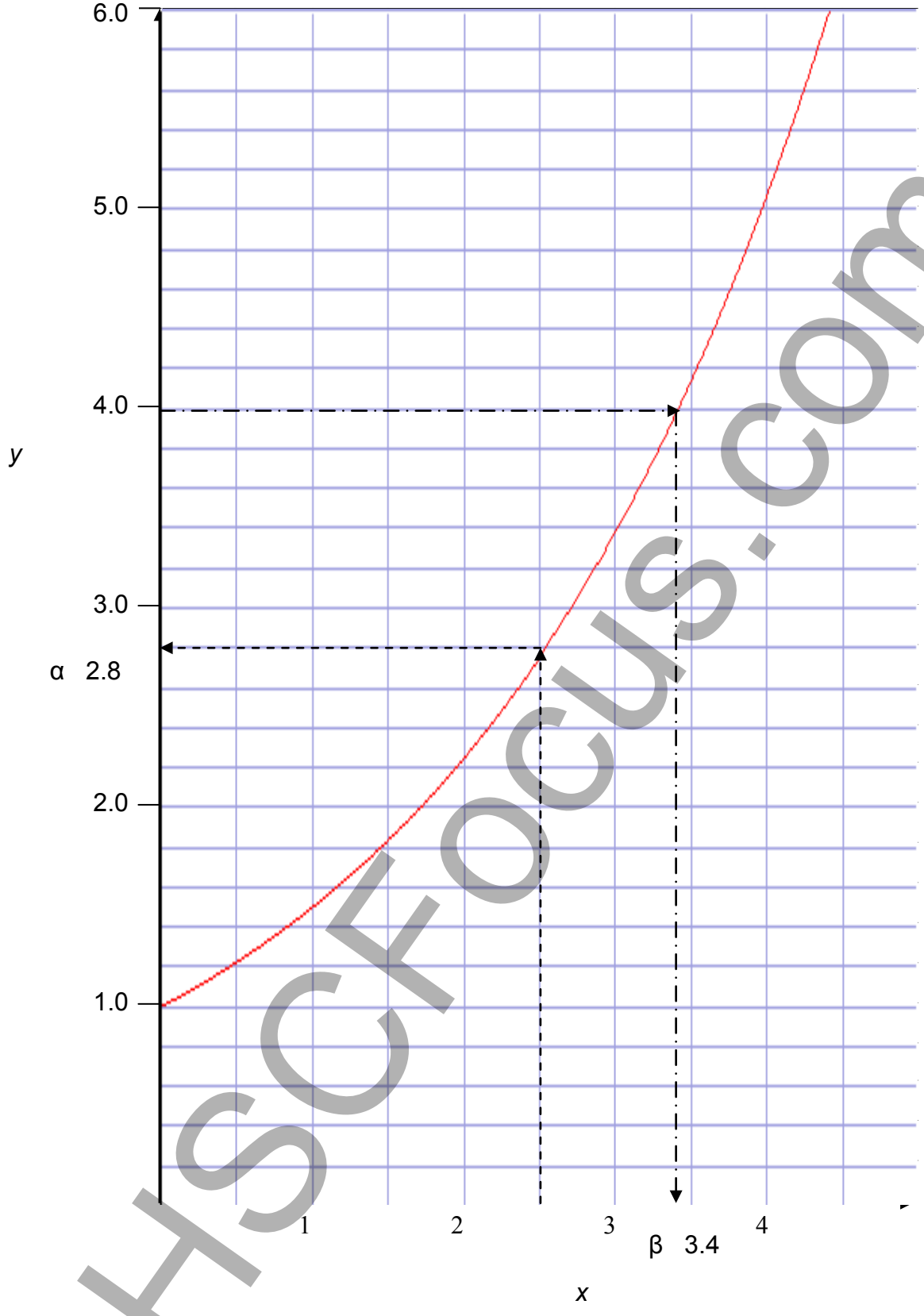
b. i.



1

	SECTION II	MARK	COMMENTS
	ii. $\angle ACB = 180 - 23 - 45 = 112°$	1	Correct diagram with markings
	iii. Using Sine Rule, $\frac{a}{SinA} = \frac{b}{SinB} = \frac{c}{SinC}$ $\frac{AC}{Sin23} = \frac{80}{Sin112}$ $AC = \frac{80Sin23}{Sin112}$ AC = 33.71km (2dp)	2	1 – correct use of sine rule 1 – correct answer
28	a. i. % Guilty = $\frac{77}{200} \times 100 = 38\frac{1}{2}\%$	1	
	ii. P(Verdict Guilty) = $\frac{17}{135}$	1	
	b. i. Total to repay = $254 \times 26 \times 5$ = \$33 020 Interest = 33 020 – 24000 = \$9 020	2	1 – total repaid 1 - interest
	ii. Total for three years = $379 \times 26 \times 3$ = \$29 562 Amount saved = 33 020 – \$29 562 = \$3 458	1	
	c. i. On Graph Paper at end of solutions.	1	
	ii. Strong negative correlation	1	
	iii. The entry cost might be a consideration when deciding whether to go to a theme park. But the park's attractions may be the deciding factor.	1	Any reasonable argument that uses the information.
	iv. On Graph Paper Median Points : M_1 = (8, 48), M_2 = (18, 19), M_3 = (28, 8)	3	1- - Medians 1 – Line joining them.
	v. Gradient $M_1 \rightarrow M_2 = \frac{-48}{20} = -2$ Move $\frac{1}{3}$ distance to M_2		1 – Move $\frac{1}{3}$ distance to M_2
	Y intercept – Read off graph = 60 Equation becomes $N = -2C + 60$	2	1 - gradient 1 - y int

Graph for Question 24 (b)



Graph for Question 28 (c) (i)

N.B. Filled dots are points plotted.
Open dots are median points (one is also plotted point)
Light line is through outer median points.
Dark line is final line moved toward middle median point.